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ABSTRACT

Many recent studies of student learning are grounded in a theoretical framework which is experiential and describes learning from the learner's perspective or "from the inside". A research project on student learning in the Open University has followed a group of 30 students through their first year of university study. Students were interviewed on three occasions. This paper concentrates on their conceptions of key concepts before the course, how these have changed over the period of the course, and their approaches to studying these concepts. The results of the study demonstrate the crucial link between students' approaches to study and the quality of the learning outcomes. Both the demands of particular learning tasks and students' development as learners influence how students go about studying. (Author/BW)

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"Understanding How Students Learn - Outcome and Approach"

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Understanding How Students Learn

Introduction

There is a considerable body of literature on research and evaluation in education both in Europe and the U.S.A. which attempts to describe student learning in natural settings. For example, Entwistle and Hounsell (1979) identified a trend in research in student learning towards qualitative methodologies so as to increase the relevance of the findings for practising teachers. Similarly, Wilson (1977) and Filstead (1979) argue for an ethnographic or qualitative approach to research and evaluation in education so that the complexity of the student and his or her ability to reflect upon experience are recognised. This is in contrast to traditional evaluation and behaviourist models of learning which ignore the conscious control of the learners over their strategies and approaches to studying.

The research group of Ference Marton at the University of Gothenburg in Sweden has been particularly influential in developing work in this field. (For a review of this work see Gibbs, Morgan & Taylor, 1980a.)

Marton and Svensson (1979) have differentiated between two different perspectives for research in student learning. The first-order perspective represented by traditional evaluation and psychometrics, is observational and describes learning "from-the-outside" whereas the second-order perspective is experiential and describes learning from the learner's perspective or "from-the-inside".

This paper will discuss studies of student learning grounded in the theoretical framework of this second-order perspective and present some of the findings of a research project on student learning in the Open University. What is known about learning when it is viewed from this second-order perspective?

There seem to be four closely related factors which have been identified in understanding how students go about studying. These are students' overall motivation or orientation, their development as learners, the details of their approaches to particular learning tasks and the content and quality of the learning outcomes. In this paper we shall concentrate on the content of learning and approaches to studying.

The Content of Learning

The majority of research on learning looks at how much is learnt, for example, in relation to students' scores on particular tests. In contrast, research from a second-order perspective attempts to describe the nature and content of what students have learnt. Dahlgren and Marton (1978), (and Dahlgren, 1978) have examined students' understanding of economics concepts in the context of a one term economics course for first year students. At the start of the course, students were asked in individual interviews, ten everyday questions about economics (for example, about cost, money, inflation, etc.). To investigate students' conceptions of price, the question "Why does a bun cost one crown?" was asked. Analysis of the interview transcripts revealed two qualitatively distinct types of answers and two sub-categories.

A1. The price of the bun is determined by the market price of its constituents - in other words, the price depends on the supply and demand situations for example, wheat, flour and transport services.

A2. The price of the bun is determined by the supply of and demand for buns.

B1. The price of the bun is the sum of the "value" of its constituents.

B2. The price of the bun is equal to its "value", because the producers have set the price.

The difference between these answers is that for the A-type, the price is conceptualised in dynamic and abstract terms whereas the B-answers describe price as a concrete and static entity. Before the course, out of eighteen students six gave answers revealing the type A conception of price. After the course, only four students gave type A answers, in fact three students who initially gave type A answers ended up giving type B answers. In spite of this, fifteen out of the eighteen students accumulated enough marks to pass the examination. The main difference in students' answers before and after the course was that economics terminology was used to describe the same conceptions. Simply, mentioning terminology was sufficient to gain enough marks to pass the examination, although for most

of the students, their understanding of the concept of price had remained unchanged. So why were these outcomes of students' learning so dismal?

Approaches to Studying

Marton and Saljo (1976) have investigated how students approach particular learning tasks and how approach is related to learning outcomes.

In one study, students were asked to study an article about educational reform in Sweden which was relevant to their course. They were then asked in individual interviews to summarise the article in a few sentences and then to reflect on how they had gone about reading the article. Analysis of the interview transcripts revealed two very different approaches to study. One group of students described their approach in the following way:

"Well, I just concentrated on trying to remember as much as possible."

"I sort of tried to memorise everything I've read - not everything, but more or less."

In contrast, another group of students described their approach, as follows:

"I tried to look for the principal ideas."

"What was the point of the article."

"I thought about how the author built up the whole thing."

These qualitatively different approaches to studying were termed "surface-level" and "deep-level", respectively.

These different approaches to study were directly related to what students had understood from the article. None of the students who described their approach in terms categorised as a surface-level approach completely understood the author's argument. In contrast, none of the students who took a deep-level approach failed to gain a good understanding of the article.

How have we used this background of research in student learning, derived from a second-order perspective to inform the design of research studies in the Open University?

Research in Student Learning in the Open University

Although there has been a considerable amount of evaluation research carried out in the Open University, the majority of studies have adopted

quantitative methodologies using closed-ended questionnaires. Learning has been described from the teacher's or evaluator's perspective and not from the learner's perspective (see Morgan, Gibbs and Taylor, 1980). In the present study, the aim is to understand the content of learning and how students are approaching studying the Open University's learning materials, by means of open-ended interviews.

Methodology

We have followed a group of thirty students through their first year of university study on the Social Science Foundation* course. This sample was selected from students who had "lower educational qualifications" i.e. the students the Open University claims to cater for, and were located geographically within about thirty miles of Milton Keynes to facilitate interviewing.

We have interviewed students on three occasions: (i) before the course about their overall motivation or orientation to university study and their understanding of key concepts to be taught in the course, (ii) during the course about the details of their approaches to study and (iii) at the end of the course about their orientation to study and understanding of key concepts.

In this paper we shall concentrate on students' conceptions of key concepts before the course, how these have changed over the period of the course and the details of their approaches to studying the particular parts of the course which teach these concepts.

With the help of the course team, we designed a set of ten questions to test students' understanding of the key concepts taught in two sections of the course on "Production and Allocation" and "Work". So, for example, we asked students "Why are trade unions powerful?" as a way to find out their conceptions of trade union power and "Surf, Omo and Radiant are all produced by Lever Bros., whilst Bold, Tide and Dreft are produced by Proctor & Gamble; in fact these two companies produce almost all the soap powder

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* The Open University's Social Science Foundation Course is a full-credit course, (6 credits are required for an Ordinary Degree).and runs over a period of nine months. The course consists of correspondence texts, supported by television and radio broadcasts, face to face tutorials and a one week residential summer school.

sold in Britain. Does this matter?", to find out their understanding of market competition. The questions were framed in everyday language, so that they were easily understandable to students before the course.

Students were asked the same questions at the end of the course, so as to investigate how their understandings of these key concepts had changed over the period of the course.

In the first and third interviews students were asked a set of ten questions in individual face-to-face interviews. The interviewer used non-directive, probing questions, such as, "Can you say anything more about that?", "Can you explain that?" etc., until the limit of students' understanding was judged to have been reached. The interviews were tape-recorded and then transcribed in full.

The analysis of the interview transcripts was carried out by carefully reading through them to identify what seemed to be the "significant points" or the "essences" of what students were saying in the interviews.

In describing the methodology of research adopting a qualitative, or second-order research perspective, it is important to stress that this analysis is not derived from existing hypotheses, as is usual in the hypothetico-deductive approach to research, but is essentially inductive looking for "interesting things" or as ethnographers would describe the method, "analytic induction".

Glaser and Strauss (1967) describe the advantages of this approach:

"The consequence of the traditional approach is often a forcing of data, as well as a neglect of relevant concepts and hypotheses that may emerge. Our approach, allowing substantive concepts and hypotheses to emerge, first on their own, enables the analyst to ascertain which, if any, existing formal theory may help him generate his substantive theories."

Obviously there is an interaction between a researcher's prior knowledge and experience and what is seen inductively as a "significant observation" or an "interesting piece of data".

Wilson (1977) makes this point very clearly:

"No one, of course, enters a situation a true "tabula rasa". Language is itself a limiting factor which provides one set of conceptual tools and screens out others. Similarly, previous experiences influence the scientist's observation and thought. In fact, traditional empirical scientific methods have sought to extrapolate along these lines by asking the researcher to be most explicit and rigorous in the formulation of the

perspective underlying the research. There is room in the realms of research, however, for other more inductive approaches where the role of the preformed hypothesis and circumscribed data gathering techniques are reduced to a minimum.

Those who work within the anthropological tradition cultivate the skill of suspending (the phenomenologists call it "bracketing") their preconceptions. They study prior research and theory as much as the traditional researcher, but they then purposely suspend this knowledge until their experience with the research setting suggests its relevance."

We have explained our approach to analysing interview transcripts in some detail, as this is a crucial issue in understanding research based in a second-order perspective.

The analysis of the interview transcripts of students' answers to questions about social science concepts has been carried out initially by our research group, to identify qualitatively different categories of answers. The answers of individual students have then been assigned to particular categories. The analysis, using our category system, has then been performed by an external judge, so as to ensure reliability of the interpretations. In general, there has been a 75% agreement on the categorisation of the interview transcripts, which, with negotiation, has led to complete agreement.

As a result of this analysis of the first and third interviews, we have obtained qualitative descriptions of students' concepts and how these have changed over the period of the course.

The second interviews, conducted about half way through the course, were designed to investigate how students had tackled studying Blocks 4 and 5 of the course, "Production and Allocation" and "Work", which taught the key concepts covered in the first and third interviews. Students were interviewed immediately after they had completed their essay assignment, so that details of studying could be easily remembered. The interviews covered all aspects of how students had used the learning materials and completed the assignment. For example "What did you do when you first started work on this Block?" "Can you explain these notes in the margin?" Again, the interviewer used non-directive probing questions to ensure that the details of a student's study strategy had been properly understood.

The interview transcripts were again analysed by the method of "analytic induction" described above.

Results

(i) Students' Initial Conceptions of Social Science Concepts

By adopting the methodology described above, what do we find by analysing students' answers obtained in the first interviews, before they have taken the course?

The analysis of the answers to the question: "Surf, Omo and Radiant are all produced by Lever Bros., whilst Bold, Tide and Dreft are produced by Proctor & Gamble; in fact these two companies produce almost all the soap powder sold in Britian. Does this matter?", designed to investigate students' understanding of market competition, revealed the following categories.

A. The extent to which the price, quality and choice of products is fixed, depends on the nature of the cooperation between the two companies. This conception describes how closely they work together. If there was no cooperation, it would be like market competition, but if they organised a cartel, it would become like a monopoly.

B. The price, quality and choice of the produce are fixed by cooperation between the two companies. There is no notion of the extent of cooperation and the nature of the fixing.

C. The price, quality and choice of the product are affected by competition. There is no notion of cooperation. There are misconceptions that two companies are the same as perfect competition or are the same as a monopoly.

D. Choice to the consumer is affected by advertising and marketing policy. This conception is concerned with choice as the number of available brands and not with anything connected with cooperation between the two companies.

E. Ignorant answers.

In a similar manner, the analysis of the question relating to trade union power, "Why are trade unions powerful?" revealed the following qualitatively different answers:

A. The power of a trade union depends on its position:

(i) Micro-position - it depends how much it will hurt if production

(ii) Macro-position - it depends on how specialised a group of workers is, how production is organised and which political party is in government.

Answers in this category are essentially describing the coercive power of trade unions.

B. The power of the unions is a result of mass membership, organisation, legislation and finance which allows them to pose a threat of the withdrawal of labour. There is no notion of influence of the context on this threat.

C. Trade union power comes from the control extended over its members. Here the trade union is identified with the leaders, who have power over the individual members.

D. The power is the legitimate power of the union, in the sense of being the accepted voice of the workers to express their views in a democratic society. This conception makes no reference to threats and coercive power.

E. Ignorant answers - e.g. "I don't really know".

These two sets of categories are what we have used to describe what was identified as "significant data" from the analysis of the transcripts. The categories were generated from "analytic induction" and not from any preconceived categories. The numbers of students in each category are shwon in Table 1.

How can this knowledge of students' understanding of a subject area be of value to curriculum developers as claimed by Marton (1980)? In the terminology of more traditional educational technology, these descriptions would represent students' entry behaviour, but derived from a qualitative methodology, rather than a score on a test.

The value of these understandings is that it provides a basis for developing the teaching of the key concepts. Rather than perhaps assuming that students understand nothing about a subject area and that everything must be taught slowly from scratch, this data clearly shows that students hold their own understanding of particular concepts. If the aim of a course is to develop and change these understandings, a knowledge of

students' initial conceptions of a subject area should form a basis for introducing and discussing new concepts. This approach to curriculum design has been taken in revising some of the teaching materials in the new social science foundation course, (see Gibbs, Morgan & Taylor, 1980b).

What changes have occurred in students' understandings of the concept of market competition and trade union power, when the same questions were asked at the end of the course?

(ii) Outcomes of Learning

As we have already stated, we are investigating learning outcomes in terms of how students' subjective conceptions of concepts have changed over the period of the course.

Table 1 shows how students' answers were described before and after the social science foundation course to questions of trade power and market competition. Although our initial sample was thirty students, drop-out reduced this sample to eighteen.

	Market Competition		Trade Union Power	
Conception	Before the Course	After the Course	Before the Course	After the Course
A	0	2	6	4
B	4	8	5	10
C	11	7	3	1
D	1	0	3	3
E	2	1	1	0

Table 1

(Data for the 18 students who completed the course)

From this data, it seems that the course has improved students' understanding of market competition as there is clearly a shift towards Type A and Type B answers.

In the case of trade union power, the changes are rather more complicated. Some students whose initial answers were of the type A conception end up giving type B answers. It appears that the majority of students' answers after the course describe trade union power in terms of mass membership, legislation, finance, etc., a type B conception, rather than in terms of coercive power.

Although, in many cases, students answered the questions in the same way before and after the course, all but one of the students in this sample passed the course in terms of the formal assessment requirements.

It is possible to relate these learning outcomes to how students described their studying of the material which teaches these key concepts?

(iii) Approaches to Studying

Interviews, lasting up to one hour, about the details of how students tackled studying Blocks 4 & 5 of the course, obviously contain a vast quantity of rich and complex data. However, reading the transcripts by the process of "analytic induction" revealed two very broad categories in students' answers.

Students were describing studying in relation to factors which could be described as their development as learners, for example, their conceptions of learning and what is required of them in reading and note taking and the specific demands of the learning activities and assignment tasks. To illustrate the details, five students will be examined as case-studies.

In many cases, descriptions of note-taking provided powerful insights into what students were attempting to do in their studying.

Here is one student explaining her notes.

S. "I suppose the notes are what I consider to be the essential parts out of the unit, which will supposedly jog my memory into remembering the rest of it. I read through the thing once, either fairly leisurely or fairly quickly depending on time, then I read through it again, in either case more thoroughly, I take notes at that point."

I. "What do you usually do when you go through it the first time?"

S. "Getting the feel for it I suppose. I didn't used to do that before I just used to read the thing and I made notes as I went and found that I was repeating notes because the same topic will crop up in different pages, perhaps the same idea will be expressed much more nicely and I found the notes would wander backwards and forwards on

the topic so well as I say I just try and get the feel of the thing and see which ideas are put forward and where. - then reading it more thoroughly reading it, to try and remember it and as I said to make notes. But going through the second time I attempt the SAQs,* I do the SAQs."

This student was also describing reading in relation to the material to her personal experiences.

S. "I read the thing pretty quickly and then go through it again and extract things which seem relevant ..... I suppose going back to the bit about applying you know if I can see that they have an application or relevant to life as I see it, you know, they strike a chord perhaps and I take note."

The same student described writing the essay as an activity which crystallised her thoughts and helped her to relate ideas together.

S. "I find the TMAs** actually crystallise ideas a lot you know, I read a block and I end up with lots of what are essentially jumbled thoughts, I am not saying they don't make sense but there is no actual structure to them. You can see that one person says this and one person says that, as to how those different ideas relate to each other in my mind comes clear when I start writing about it. I try and construct a pattern I suppose and then fit different authors' ideas into it and agree or disagree depending on the point I am trying to make."

(Student No. 1)

Here is another student describing his method of note taking in relation to the essay assignment.

S. "I tend to make my notes when I get to the essay, which I normally do at the end assuming I've read right the way through - I probably mentally write it several times while I'm driving to work ..... because when you are driving you can't do much else except think - I go over the thing, without the book in my hand obviously and I think where is the course going I try to sift out the salient points, sometimes you can start to link them together."

(Student No. 2)

The majority of students described attempts to summarise and make notes from the vast amount of reading material supplied by the university. However, the main differences between students seems to be the purpose and function they see in performing this task.

The following student appears to have a very different aim in summarising the teaching text.

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* SAQ = Self-assessment question

** TMA = Tutor Marked Assignment

S. "I picked out the main points, I read through it and the main points I picked out and put them on tapes. I tried that first for a change ..... What I have been doing before, I have been writing what I consider to be quite a lot of notes - this time the only notes I have really taken are to do with the actual assignment, the written assignment. I have taken some notes on that but the rest I have been putting on tape, which I am trying to learn..... I think it comes over better you know getting it on an oral basis rather than reading it all the way through because a lot of these notes were what was in here just a matter of sheer copying from the unit. In the first three blocks, I got a fail in each of them, I wrote dozens and dozens of pages of notes and quite frankly when you start to look at it and you think was there that much in that block, it starts to give you a bit of a - I don't know quite how to explain it - you start something and you think I've got to learn all that lot. But on the tape it doesn't seem to be so much."

(Student No. 3)

In a similar way another student used a card index to aid memorization.

I. "How do you tackle the Block?"

S. "I have a quick look and see how long I am going to take on it and then I just read straight through it and use the jolly old red felt tip, and I always speed read through which is probably why I find it a bit difficult to assimilate it. ..... I ring various theories as I go through, I possibly go through it and I make a few notes on small cards on what the various theories are..... What I tend to put down is the main points in each block, what the answers are in the main points of each block, one usually finds at the back ..... it's like an exam quiz - a sort of aide memoire for regurgitation."

The very strategic study method of this student seemed to be quite clear.

S. "To be quite fair about the way I am doing it, I suppose I am doing the minimal study to sort of achieve the end result and so from that point of view, my need is to have something which is more succinctly encapsulated and I could use the cards in that fashion - The T.V. programmes I think - you can quite easily miss them."

(Student No. 4)

Both of these students (No's 3 & 4) are attempting to summarise the main points of the course material, but then appear to be adopting almost rote-type memorization techniques in their studying.

Another student described the problems of using the correspondence text as follows.

S. "I would have liked some lead up to study. I don't know, I think I do sort of harp back to school and I feel that I would be happy if someone said this is what you do. I can't get out of that thing I don't think - I don't know."

S. This student had described studying as hoping that material would "sink-in", but seemed to be very unclear what this might consist of.

S. "I might be quite wrong but it's not so much that you are learning a set amount of facts that you have then got to present as an answer to an exam question, isn't it? I assume you are going to be given something - questions on the stuff that you have studied, but argue it around from a different point of view to the questions that you have had for your TMA. Is that sort of basically what's going to happen? I don't know so perhaps it might have done. I just think that I harped back to school days too much and I am surprised that there aren't the facts there presented for me and I don't know. I do find some of the course text. - I read it through and I think oh I don't know what an earth I have read there, I read it through page after page."

The confusion expressed by this student of what is required of him in university level study was also evident in his approach to studying and reading.

S. "I know I read fast, but I was reading extra slowly to try and take it in. I just wonder if I've got out of the habit of reading and taking things in. Because I read a tremendous amount, Autobiographies I quite like. It is for entertainment more than anything. And I do tend to skim I suppose I wonder if I am doing that.... But I can't slow my reading down and that coupled with the total inability to make notes, probably isn't helping."

(Student No. 5)

In understanding the approach of this student (No. 5), it appears that his approach to reading and studying is heavily influenced by his conception of learning. The teaching material does not merely present facts for memorization, as in a large amount of school learning; in fact the student recognises that something different is required, but does not appear to have an understanding of what this could be. This conception of learning coupled with some notion of speed reading, so as to rush through the correspondence text lead to an ineffective study method.

This data gives an idea of the range of descriptions that students gave for their methods of studying. How can these cases be related to the existing research work on approaches to studying?

The nature of the learning tasks in the present study cover far more materials and extend over a longer period of study time than previous research in this area. By adopting an ethnographic approach to analysis, the complexities of student learning in the Open University are maintained rather than assigning students to predetermined categories.

At this stage, however, it seems useful to reflect on the present findings in relation to existing theory. In the terms of Marton and Saljo (1976), the first two students would be described as taking a deep-level approach and the other three as adopting a surface-level approach. However, the descriptions of the two qualitatively distinct approaches would be somewhat different from the categories of Marton and Saljo (1976) because of the greater complexity of the learning tasks.

How do the approaches of particular students relate to the quality of the learning outcomes?

At this stage, we have not carried out a complete analysis of the approach interviews. However, it is clear from the data presented here, that there are great differences in study methods.

In the earlier section on learning outcomes, students who had type A conceptions of market competition and trade union power described their approaches in ways similar to students No's 1 and 2 above. What is more significant, is that students whose approach to study is represented by the last example (No. 5) failed to give adequate answers to the questions, that is, D type conceptions, both before and <u>after</u> the course.

Thus for Open University students the nature of their approaches to studying appear to have a crucial influence on the content of the learning outcomes.

Conclusions

The results of the present study demonstrate the crucial link between students' approaches to study and the quality of the learning outcomes. This relationship, initially identified with conventional university students, also applies to adult students studying at a distance with the Open University.

How can the understanding derived from this study be of value in improving student learning?

The analysis of the approach interviews indicates that both the demands of particular learning tasks and students' development as learners influence how students go about studying.

In the preparation of distance teaching materials, course designers pay particular attention to designing activities, self- assessment questions and essay assignments so as to encourage or even manipulate students to engage in a deep-level or active approach to study. However, these attempts by themselves seem unlikely to succeed if they omit to consider the development of the student as a learner. How students approach studying is also related to their conceptions of learning or what they perceive as being required of them as a university student.

In order to improve learning, we have to find out the different ways in which students think about the content and design activities to encourage an active approach and to raise their consciousness of the way they set about studying.

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